<table>
<thead>
<tr>
<th>Dialog</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Printer selection</td>
<td>3</td>
</tr>
<tr>
<td>Print configuration</td>
<td>3</td>
</tr>
<tr>
<td>Print parameters</td>
<td>5</td>
</tr>
<tr>
<td>Dithering (Part 1)</td>
<td>5</td>
</tr>
<tr>
<td>Dithering (Part 2)</td>
<td>10</td>
</tr>
<tr>
<td>Measurement device</td>
<td>6</td>
</tr>
<tr>
<td>Custom inks setup</td>
<td>7</td>
</tr>
<tr>
<td>Double inks setup</td>
<td>7</td>
</tr>
<tr>
<td>Mask channel settings</td>
<td>8</td>
</tr>
<tr>
<td>Single ink limit</td>
<td>11</td>
</tr>
<tr>
<td>Print layout</td>
<td>12</td>
</tr>
<tr>
<td>Linearization</td>
<td>14</td>
</tr>
<tr>
<td>Measurement dialog</td>
<td>14</td>
</tr>
<tr>
<td>Densities and ink cut</td>
<td>15</td>
</tr>
<tr>
<td>A guide for optimal ink cut</td>
<td>17</td>
</tr>
<tr>
<td>Ink control</td>
<td>20</td>
</tr>
<tr>
<td>Mixed ink limit</td>
<td>22</td>
</tr>
<tr>
<td>hueman black generation</td>
<td>23</td>
</tr>
<tr>
<td>hueman black generation Advanced</td>
<td>25</td>
</tr>
<tr>
<td>Printer profiling</td>
<td>27</td>
</tr>
<tr>
<td>Printer profile selection</td>
<td>27</td>
</tr>
</tbody>
</table>
Start Calibration Wizard 7

Calibration Wizard 7 (CW7) is a color calibration wizard for neoStampa 7 to color control your inkjet printer. With CW7 you can print different kind of test charts in order to control and set ink amount, linearization curves, maximum ink limits, print an ICC target and create an ICC printer profile (requires a special license).

Print Configuration

Setup the driver and the printing options that you’d like to calibrate. All of these parameters will be saved into the resulting printing scheme. If you haven’t yet configured a driver, first open neoStampa 7 RIP and follow the instructions to add a new driver with the required connection (e.g. TCP/IP port, USB or FILE printer)
**Printer driver**
Select from the drop-down list the printer that you want to calibrate. If the printer is not in the list, you can add the driver in neoStampa 7 RIP software. If your maximum number of printers (usually 2) is already in use, you can contact your distributor to ask for a license to activate additional drivers. Note however that neoStampa 7 RIP allows to simultaneously run 2 printers if you have 2 or more CPUs.

**Printer connection**
CW7 will show and use the connection which you have set in neoStampa 7 RIP software. You can alter the connection type and set the port number by pressing the square button with the three dots next to the list.

**Start a new calibration**
Use this radio button if you want to start a complete new calibration with CS7.

**Media name**
This optional text box can be used to put a media name or parameters that you’d like to comment on the media (e.g. article number, pretreatment, etc.)

**Ink type**
This optional text box can be used to set ink-specific parameters, such as name of supplier, type of ink, etc.

**Quality**
The quality is usually printer dependent and are provided by the driver specifications of the printer manufacturer. Usually the printing resolution is set here. In the “Advanced...” button next to this drop-down list you can see and change if necessary printer specific parameters, such as uni- or bi-directional printing, number of passes, etc. Also here, the content of this window is driver specific. Inedit gives effort to supply the parameters of the machine manufacturer’s documentation as good and as clear as possible.

**Scheme**
The scheme text box allows to enter a name for the calibration. This name will be shown in the bottom-left part of CW7 during the calibration process so you always know on which calibration you are working.
When finalizing a calibration in the last window of CW7 (Finish...) you are prompted to store the final name of a calibration, so you can still change it if you want.

**Continue an existing calibration**
You can view or alter a previously started (and unfinished) calibration. During the calibration process the data will be stored when prompted if you hit the Exit button. If you chose to discard data of previously started calibration when hitting Exit, then all the data will be lost.
If you’d like to view or alter data from a finished calibration, hit the button to “Show already completed calibrations”. Note however that changing parameters will affect the results and might require printing and creating a new ICC profile.

**Perform or configure printer equalization**
This function allows to equalize the behaviour of linearization and ink peak per channel of a pool of similar printers. This topic will be explained in a separate tutorial.

**Previous / Next**
Hit Next to continue the calibration or Previous if you want to view or change parameters from a previous window.

**Exit**
Hit Exit if you’d like to exit CW7. If you’ve already started a calibration you are prompted to save or discard the data.
Print Parameters

Set diverse color-, quality- and raster-specific parameters in this window.

Color mode
Select from the drop-down list the color mode that you would like to calibrate. The available color modes depend on the printer specifications.

Set color order (important!)
Hit the three buttons next to color mode to set the color order for the selected color mode (explained 2 pages later in this tutorial).

Quality
The quality is usually printer dependent and are provided by the driver specifications of the printer manufacturer. Usually the printing resolution is set here. In the “Advanced...” button next to this drop-down list you can see and change if necessary printer specific parameters, such as uni- or bi-directional printing, number of passes, etc. Also here, the content of this window is driver specific. Inedit gives effort to supply the parameters of the machine manufacturer’s documentation as good and as clear as possible.

Dithering (Part 1)

neoStampa 7 provides different raster methods, whereas especially 2 methods are of most interest to the user:

Smooth Stochastic (default): This raster is a matrix-based method places the dot matrix in the most homogenous way and is recommended for all types of inkjet printers. It is however also a dangerous method since, especially with n-level printheads (e.g. 2bit, 3 levels, “grayscale” printheads), the nozzle can suffer from stress. Example: With 3 levels of dropsizes, above 33% of effective dot usage, the nozzle has to fire dots all the time. Between 33-66% it will be either drop 1 or drop 2. Between 66-100% it will be either drop 2 or drop 3. So above 33% the nozzle is always firing either drop 1, 2 or 3.
Dithering (continued)

Diffusion v2 (for variable dot printheads only):
This raster is based on a Smooth Stochastic matrix but adds some error diffusion to the final raster. Effectively talking, this method puts wholes into the regular matrix in order to give time for relaxation to the nozzle to prevent bending occurring from the previously mentioned stress factor. The raster method is homogenous as well, but since certain dots are removed it might be that the dot placement does not look as “perfect” as with Smooth Stochastic. You can set the Diffusion v2 amount of error in the three dots placed next to the drop down list (explained later in this tutorial).

The other raster methods are on experimental basis, however Inedit recommends the use of one of the above explained raster types. For further questions do not hesitate to contact your distributor or Inedit.

Configure...

This button lets you set the type of spectrophotometer to read the linearization and ICC target. Depending on which spectrophotometer you select, the charts will be printed differently.

![Image of Measurement device]

Device:
Set the spectrophotometer that you want to use. The EyeOne is a product of formerly Gretag-Macbeth now owned by X-Rite. This driver works also for i1Pro. Set the Port if you have a serial-connected spectrophotometer, such as the X-Rite SP62.

Transparency:
This mode is only for emissive measurements, such as Monitor profiling and similar. We recommend NOT to use this.

Manual mode:
In case the normal strip per strip measurement of EyeOne/i1 does not work (e.g. if the spacers are abnormal from printing conditions or the printed target is extremely grainy from old printhead types, you can switch to the Manual mode. You can also toggle between the regular (strip per strip) measurement to the Manual mode when reading a single target. If this is needed, just hit OK during reading, change the parameter in this window, return to the target measurement window and continue reading patch per patch.

Density based linearization:
The regular linearization is based on CIELAB measurements, which is also the default for ICC profiles and the recommended mode by Inedit. This button allows to toggle to a density based measurement for linearization, which leads to a more traditional-like linearization curve as it was used before CIELAB measurements became standard. The visual behaviour of this density measurement will be a more strong color, but from ICC point of view not correct. It can help in certain printing conditions to avoid over-linearization but it is not recommended for usual printing environments.
Custom inks setup

This window opens when you click on the three dots next to Color mode in the previous window. You can set here the ink order and additional parameters for multiple inks and special colors, such as Dilution inks, Mask inks, White inks, etc.

Print...

In case you are not sure what ink order is loaded, you can use this button to print out a small chart showing a number for each printed base color. Certain printers have a special ink order coming from the driver documentation (e.g. Epson, Mutoh). It is recommended to print out this chart if you are not sure or if you encounter strange color effects during the calibration process (e.g. Black prints Cyan).

Set color order

In the left side of this window set the inks in use to the order of your machine or to the previously printed mini chart. There are many inks available in neoStampa RIP, make sure that you select the correct ones. Be careful when selecting Gray and Light Gray. Light Gray color can only be used if Gray is also present. Gray is sometimes also called Light Black by certain ink suppliers. And Light Gray would be Light Light Black.

Double ink...

If you would like to have the RIP control multiple inks, you can put the same ink into different slots multiple times. If you do so, you will see that the “Double ink...” button becomes available and lets you specify the behaviour between these multiple inks. If you have multiple inks of the same color but you can’t select the “Double ink...” button, then just click on the Color next to the Ink name to select one of the multiple inks.
**Channel:**

Toggle here between the multiple inks. For each ink you can set an individual curve behaviour. Using multiple inks is basically to make the total color get darker or more saturated. Setting different behaviour for each of the multiple ink allows to enable special conditions, such as minimizing dithering in lighter areas. A consideration in this software-based approach of multiple inks should be laid upon the fact that certain printheads are more used that other ones. Finally the combination of multiple inks including all the parameters are linearized as one new ink.

We recommend that at least one channel should be linear and that you should NOT change the parameters after you have linearized the combo.

**View curve**

The middle area of this window presents the behaviour of the curve for the selected ink. Make sure that it looks smooth if you’d like to have a homogenous result. You can change the Start, Body and End parameters to shape the curve.

**Start:**

This value defines where the ink starts. 25 means that the selected channel would not print below 25% of original coverage.

**Body:**

This value shapes the body of the curve. You can try different values to evaluate which ones is most suited to deliver a smooth shape. 75 is a good value if Start is set to 25 and End is set to 100.

**End:**

This value should be usually set to 100, since the idea is to get darker color. Note however that in some cases you might have too much ink, which will have to be reduced again in the ink cut procedure explained later in this tutorial.

**Mask...**

If you have special inks loaded, such as a penetration liquid, dilution ink, mask or white inks, you can set parameters for this ink in the Mask channel settings window. The button becomes available when you chose and select one of the following inks: Mask, White (background), Dilution ink

Get from alpha channel

As the name says, the image to print requires an additional Alpha channel added to the image, e.g. manually created in Photoshop. The ink then uses the channel information to print the content. Depending on the printer, the ink will be printed in a separate pass or simultaneously with the other inks.

**Full mask**

neoStampa will create a flat color underneath the image whenever a pixel is present (with Photoshop: always. with Illustrator/CorelDraw: whenever an object contains a color information, such as white). Note that the full mask generation is only done if the image is in Grayscale, RGB, CMYK or LAB, but not with Multichannel files. So when printing linearization targets the full mask will not print.
Shadow mask

neoStampa will create an intelligent grayscale mask underneath the image information according to its color intensity and color darkness. Usually this mode is used when printing white ink, e.g. for T-Shirt printing. Note that the Shadow mask generation is only done if the image is in Grayscale, RGB, CMYK or LAB, but not with Multichannel files. So when printing linearization targets the shadow mask will not print, but it will be generated when printing the ICC target.

Fill ink

This method is usually used for penetration liquid or for a fill-up ink, such as dilution inks or similar. The penetration liquid is provided by several ink suppliers with the idea of helping inks in lower percentages to penetrate through the textile media. The fill ink method needs specifying an Intensity and Minimal value explained underneath.

Put ink in white pixels

Usually white pixels do not require a penetration liquid or dilution ink for economical reasons since the area is not printed anyway. In certain printing environments (e.g. carpet printing using Zimmer ChromoJET800) this check-box helps to create a blocking area around the colored image using dilution ink to prevent colors from bleeding into non-printed areas. Note that “white pixels” refer to an image information with an object containing any color (Photoshop: always. Illustrator/CorelDraw: whenever an object is found containing a white color.)

Intensity

The Fill ink method will fill up with dilution ink, whenever this specified value is not reached by the absolute amount of other inks in the inkset. So when you print 10% Cyan + 25% Magenta + 30% Gray, the absolute amount of ink will be 65%. In this case neoStampa will add 35% of dilution ink for better penetration automatically. A recommended value is either 100% (valid for most cases) or the amount of per-channel ink cut during the linearization process (e.g. when Cyan, Magenta, Yellow, etc. are cut to 80%, this value can be set to 80% as well).

Minimum value

Specifying a minimum value for the Fill ink method adds a certain amount to an absolute ink amount in any case. Scenario: If you set Intensity to 100% and the Minimum value to 10% and the absolute amount of ink of 25% Cyan + 35% Magenta + 75% Gray exceeds the 100% of specified Intensity, then neoStampa will add another 10% on top of it. This will help the ink to penetrate even more, but can also cause a certain amount of bleeding if applied too much. This value should be used with care.

hueman Multicolor ©

Engine

This drop-down list sets the color engine of hueman. You should ALWAYS use version 2 since it provides the best and smoothest results for all inkjet printers.

hueman Multicolor ©

Inkset

This text box shows if the actual ink combination is valid and was found in the internal color engine mechanism. In usual printing environment, you must always set at least following 4 inks: Black, Cyan, Magenta, Yellow. Inedit is currently working on a ceramic-based solution which also allows above combination without Black ink.

If your selected ink combination is not valid, first try with OK to exit this window, then re-enter again and view if it becomes available as a valid inkset. This is sometimes caused due to refresh issues in some windows. If, after this procedure, the Inkset box still shows no valid inkset you might need to review, whether the inks are set correctly or if one of the above 4 required inks are missing.

If you have a special request on an inkset that is not supported by neoStampa, do not hesitate to contact Inedit to ask for a possibility to add it.
Dithering (Part 2)  Selecting any of the raster methods previously explained, you can hit the three dots next to the drop-down list to view and change raster-specific settings:

Disable large dot  
If you have a delicate media that cannot pick up a lot of ink, disabling the largest dot (available with 2bit / 3 or more level printheads only!) can help. It can also help if the printhead has problems firing the large dot, but this is quite a rare scenario. As the name says, the largest dot will not be produced during rastering. We recommend however not to use this function as reducing ink in the per-channel ink cut provides more control.

Disable small dot  
In some printing environment using certain printheads, the small dot never reaches the media since a combination of a small dot with high printing carrier movement speed and/or electrostatic charge (e.g. using polyester fibres) deviates the dot so much, that it is literally blown away. This can cause a lot of residual ink in the environment and the dust is placed anywhere but certainly not wanted. Using this function switches off the usage of the smallest dots (available with 2bit / 3 or more level printheads only!).

In black ink only  
If this box is selected in combination with “Disable small dot”, then the smallest dot is omitted of the Black channel(s) only.

Smoothness  
This value becomes available when working with Diffusion v2 raster method in combination with an n-Bit / n-Level printhead. The smoothness defines the amount of error introduced to the matrix raster to avoid stress from the nozzles when firing full-time (mentioned in Dithering Part 1). A smoothness of 10 means that Diffusion v2 does not have any error diffusion (=Smooth Stochastic). By decreasing this value, dots are removed from the regular matrix and the n-Levels of variable drop technology are diffused into each other. A value of 6-9 delivers a good balance between quality and stress-reduction to printheads with variable dot technology. If you go lower than this value, there can be too much noise in the result and the print-out will go grainy. We recommend a value of 7 if you encounter such a firing stress problem. Note that changing to Diffusion v2 or changing the amount of Smoothness requires relinearizing the printing conditions.
**Dot gain compensation**  
Certain printing conditions have a very high dot gain. This can result in an extreme linearization curve and might result in a bad per-channel gradient. Especially affected is sublimation printing and certain variable printheads (e.g. Kyocera printhead using more than 8 dot levels). This parameter allows to compensate a high dot gain to a more moderate behaviour with a “regular” linearization shape. In the above affected printing situation, a value of 20% might help to equalize the behaviour quite well. This function is however rather delicate, we recommend to get in touch with your distributor or with Inedit if you think that your printer might have a high dot gain. We will then recommend a certain value for your printing environment.

**Dot multiplier**  
This value must be left at “1”. We recommend NOT to change it.

**Single ink limit**

We will now start to ink control and linearize our printing conditions.

![Single ink limit chart and linearization interface](image)

**Print...**  
Print the single ink limit chart. For EyeOne spectrophotometer a combined chart of single ink limit and linearization is produced. The interpretation and usage is explained later in this tutorial.

**Global ink usage**  
If your print-out shows far too much ink on all patches, especially the linearization patches, then you can globally reduce all ink simultaneously with this value and re-print the chart. We will learn how to interpret and to use this parameter on the next page.

**Per-channel ink cut**  
If your print-out shows far too much ink on all patches, especially the linearization patches, then you can reduce individual inks using the separate boxes and re-print the chart. We will learn how to interpret and to use these parameters on the next page.
You can set here printing parameters, such as orientation (portrait or landscape), mirror printing (transfer printing), horizontal and vertical position, copies and scaling. With EyeOne spectrophotometer and single ink limit chart as well as linearization chart we recommend to use portrait printing in combination with 100% scaling.

Define the page settings here. The width will present the layout of the placed chart. You can either set roll media (infinite) or cut sheet media (with a certain length).

Printer driver specific parameters can be altered here, such as uni- or bi-directional printing or cut sheet at the end of the print out. Depending on the printer, additional printing parameters can be adjusted inside the "Advanced..." window. As explained in the first chapter (Print configurations) the advanced window only shows printer-specific parameters provided by the driver documentation of the printer manufacturer. Usually you can set here the amount of passes, overprint, feed adjustment, etc. But since you've probably set all the parameters in a previous window it is not required that you change them here.

This part of the window shows how the chart will be printed. Note that neoStampa's layout is generally 90° rotated counter-clockwise, so from left bottom to left top will be your printer's media width. If the media width in page setup is smaller than the chart's width, the chart will be cut automatically.

Since the charts in the ink cut, linearization, ink limit and rich black (black addition) are based on a multichannel file format, the channel order will be considered in such a way that the main channels K,C,M,Y are automatically re-arranged to the top four positions. We recommend not to re-arrange the order of the channels here.

Click Ok to print the chart or Cancel to exit the window without printing.
Print chart evaluation

To evaluate the test chart make sure that the print has dried and - if using textile material - fixated or steamed and washed.

Ink pre-limitting REQUIRED!

Ink-prelimitting is required because:

All of the 2-color-mix patches are bleeding (a) OR the darkest patches of the linearization strips are bleeding (b).

Follow the instructions

If all of the 2-color-mix patches are bleeding you should first try to find out whether the material is not suited for the inks or the print has been made with a too high resolution. After you can try to limit globally or per channel and reprint the chart using the Print... button under "Linearization". It’s recommended to try several ink cuts until you reach a reasonable printout that does not require pre-limitting (see picture on top right).

If the darkest patches of the linearization strips are bleeding try to evaluate which darkest patch of each ink is free from bleeding and put the percentage in the appropriate ink box. The example on the LEFT shows that the best bleeding-free patch is at 80%, so we enter this percentage into the channels.

After setting the ink-prelimitting values reprint the chart using the Print... button as shown hereunder.

Ink-prelimitting not required

Ink-prelimitting is not required because:

neoStampa supports post-linearization ink cutting and if only some of the 2-color-mix patches are bleeding it’s possible to cut each ink after linearizing.

-> Proceed to “Linearization”

Global ink usage

If the printed test chart requires pre-limitting you can decrease the percentage of global ink usage in order to get less ink. This percentage will be used the same for all inks.

Ink limit per ink

If the printed test chart requires pre-limitting you can decrease the percentage of each ink individually (e.g. if the yellow ink is bleeding more than another color). As this option allows more control it’s recommended.
Linearization

If ink pre-limitting is not required, hit the “Start” button to measure the target. If ink pre-limitting was required, please refer back to the previous page and put some ink cut to the individual channels or the global ink usage and hit the “Print...” button again in this part of the window.

Measure dialog

When the window pops up, you will be prompted to calibrate your measurement device. Depending on what you have chosen in the previous window (see “Configure...”) CW7 attempts to connect with the spectrophotometer and asks for a white tile calibration. Follow the instructions on the screen and wait until CW7 is ready for measurement. Usually you can see this when “Current” shows number 1 or letter A, depending on which chart you are about to read.

Start / Stop

This connects or disconnects the spectrophotometer in use. If CW7 failed to connect you can try to re-connect the spectrophotometer by clicking on “Start”. Please refer to the user manuals of the spectrophotometer if you have problems with the connection or connect your distributor or Inedit if you need further help.

Current / Total

See here the progress of the measurement and the “Total” amount of strips or patches to be read.

Progress

Measure the strips or patches shown in the “Progress” window. Do NOT read the order from the printed chart, read the color that is shown in this window! In the example here, the 3rd line to read is Light Cyan, not Magenta as it’s printed in the linearization chart. Depending on the ink order in the printer the order can vary, so simply follow the color that is shown in the “Progress” window until all the strips or patches are read. You can jump to a previous strip or patch by clicking on the appropriate line if you want to re-read. Always read the strips from light to dark.

Ok / Cancel

When you read all the strips or patches, hit Ok to proceed with the calibration or Cancel to exit the window without saving the measurements.
**Linearization - Densities and ink cut dialog**

When you finish reading and the the Ok button in the measurement dialog, the densities dialog will automatically pop up. This dialog shows the measurement results based on LAB measurements per color (or Density measurements if you put the check-box in the “Configure...” window of the EyeOne/i1 spectro explained previously.)

If ink pre-limitting was not required or after pre-limitting you still have some bleeding or ink excess in the 2-color-mixes that is not a problem, since you can cut the inks after the linearization as well. In fact you HAVE to cut the inks if you have some bleeding in the 2-color-mixes.

In the example shown here, we HAVE to cut the indidivual colors to 78% as above that, the combination of inks is excessing the pick-up of the media (= “bleeding” in digital textile printing).

If ink pre-limitting was not required or after pre-limitting you still have some bleeding or ink excess in the 2-color-mixes that is not a problem, since you can cut the inks after the linearization as well. In fact you HAVE to cut the inks if you have some bleeding in the 2-color-mixes.

In the example shown here, we HAVE to cut the indidivual colors to 78% as above that, the combination of inks is excessing the pick-up of the media (= “bleeding” in digital textile printing).

**Ink cut (dark)**

If ink pre-limitting was not required or after pre-limitting you still have some bleeding or ink excess in the 2-color-mixes that is not a problem, since you can cut the inks after the linearization as well. In fact you HAVE to cut the inks if you have some bleeding in the 2-color-mixes.

In the example shown here, we HAVE to cut the indidivual colors to 78% as above that, the combination of inks is excessing the pick-up of the media (= “bleeding” in digital textile printing).

In “ink cut (dark)” put now all colors to 78%. You can treat the Black (K) as an independent color and chose your best black based on a visual analysis of the print-out since we will control the mix with black in the ink limit procedure, which will come later. It is no problem to leave K at 100% if a) the visual Black is best at 100% or b) if the curve shows the highest peak of Black at 100%.

In the example above however the Black curve shows almost no increase of density between 90-100%, so you can easily cut the ink to 90% as well to save ink. In fact even between 80-100% there is just an increase of 1-2% so it is up to you to decide whether you want to accept the slight difference in order to save even more ink.
**Ink cut (light)**

If you have specified light inks in your color mode, then the light inks will be determined automatically based on the dark inks and based on which Light ink mode you have selected. Note that the calculation is done on the fly so you might see certain values jumping when changing the ink cut in dark inks.

**Light ink mode**

The light ink mode offers some possibilities to increase or decrease the amount of light ink used in the dark and light (D&L) calculation. The recommended mode is “Normal”, which bases the D&L ratio to 67% dark and 33% light ink. If you have 3 shades per ink the D&L ratio will be 50% dark, 25% light and 25% light light ink.

If you have a very delicate media and encounter light ink excess, such as with glossy paper, you can toggle to use “Less light ink”. The D&L ratio then changes to 80% dark and 20% light ink. If you have 3 shades per ink then the D&L ratio will be 67% dark, 16% light and 16% light light ink.

If you need more light ink because your printhead has a low resolution or because you’d like to have more penetration using more light ink, then you can toggle to use “More light ink”. The D&L ratio will change to 50% dark and 50% light ink. If you have 3 shades per ink, the D&L ratio will be 33% dark, 33% light and 33% light light ink. Be careful with this mode since you might encounter some light ink excess.

**Density curves**

This is the view of the result from the measurement based on either LAB values or density values or Chroma behaviour if you toggle through the inks with the radio-button checked left of to the ink name’s short-cut (see (d) in the guide on the next pages).
**A guide to evaluate what should be done to obtain the optimal ink cut**

It's basically just necessary to cut the ink if you have some ink excess in the 2-color mixes. There is some more intelligent function in CW7 to analyze and auto-recommend further ink cut. Here is some explanation.

---

**a)**
ICCPrin will automatically perform an automatic ink cut (a) based on the measured values. The example above shows a recommended auto ink cut to 95% as the measured patches of 95% and 100% have been equal.

**b)**
By checking the density curve behaviour or density peak (b) and cutting to a reasonable value it's possible to save ink costs. The example above shows that cutting the Black ink to 50% only a loss of 3 - 4% intensity compared to 100% will be obtained, but almost 50% of ink consumption can be saved!

---

**c)**
By help of the test chart printed previously it's possible to analyze the 2-color-mix patches and find best or bleeding-free percentage (c). If none of the 2-color-mix patches are bleeding, no ink cutting is required.

The cut value of the 2-color-mix patches are to be used for all dark colors (including other process colors) except Black. The Black can be cut independently should be based on the conclusions of (a) and (b) as well.
d) In certain inks you can see some grid appearing in the background of the densities curve preview. You can click through the inks marked with a radio-button just left to the ink name’s short cut to view the individual inks. The grid might have 2 reasons:

1 - One reason can be that CW7 detected a peak before the 100% has been achieved. This actually refers to the same idea as explained in a). Proceed accordingly, it is just a recommendation by CW7 you can use this info or ignore it.

2 - The other reason for the grid might be a detection of Chroma decrease by one of the inks. Chroma refers to the saturation of an ink in the LAB/LCH color space and tells you whether an ink desaturates when it is printed in higher densities. Click the “Show chroma” check-box to toggle the view to Chroma.

In the Blue ink a grid is shown between 55-100%. Switching to the Chroma view we now understand why: The ink seems to desaturate a lot with higher density although the previous view (standard LAB) shows a steady increase of density to 100%. CW7 automatically recommendeds an ink cut at 55%, balancing the regular density and the Chroma over-saturation to achieve an optimal result.

Note that CW7 will automatically put a recommended ink cut to this calculated value (e.g. 55%). You do not actually have to cut it here, although it might make the profile more linear, especially from ink-to-black. The drawback to this approach is that you might limit the gamut of the profile since the ink is cut much earlier than the actual peak of the density.

If you have further question to the Chroma behaviour or if one of your printer’s ink has some strange Chroma over-saturation, contact your distributor or Inedit for further information.
IMPORTANT: Enter the LOWEST percentage of these three informations (a), (b), (c) and (d) into the ink cut boxes.

**Color**
Example (a) auto-cut = 95%
(b) visual density peak = 90%
(c) 2-color-mix patches = 80%
(d) grid = 85%
Conclusion (c) is the lowest number, so it’s recommended to put 80% into the yellow ink cut box

**Black**
Example (a) auto-cut = 95%
(b) visual density peak = 50%
(c) 2-color-mix patches = between 100% and 80% (see Special note “Black”)
(d) grid = 90%
Conclusion (b) is the lowest number, so it’s recommended to put 50% into the Black ink cut box

Hit Ok when you have finished entering the ink cut values or Cancel to exit this window without saving.
Linearization - Correcting linearization curves

After exiting from the densities window you will be back to the “Linearization” window and you will see that the density curves and the linearization curves are now displayed:

![Image of density and linearization curves]

Densities... You can go back to the previous density dialog by pressing this button. But since you’ve already finished this procedure you can proceed to the next button “Linearization...”.

Be careful when you re-enter the densities dialog: When you hit Ok, all the manual modifications/changes in the Linearization window will be discarded!

Linearization... Click this button to enter the ink control dialog to perform manual adjustments of the linearization curves, e.g. due to irregular measurements from a structured media.

This function enables an intelligent method to use light inks where it is really needed (in light colors) but decreases the amount of light inks where it is not really noticed (in medium to dark shades). The function detects a darkness of an ink based on the linearization measurement and only applies if a certain color darkness is reached. Example: If you have a color that contains 100% Blue ink and 10% Magenta ink (before D&L), the Light Magenta will be minimized automatically since adding (dark) Magenta to Blue doesn’t show much dithering from Magenta, but maintains the color darkness and saturation. If you think that you have too much dithering from the Magenta, you can switch off this function.
Channel

Toggle between the channels to change the view of the linearization curve to the actual selected ink. Only correct a curve if you really think that a certain point is shifted due to measurement irregularities as shown in the example below.

![Channel View]

In certain extreme density conditions, e.g. if your printer has a strong linearization correction, it is possible that the last 1-2 points in the linearization curves “touch” the right side of the curve’s border. It’s recommended that you move the last 1-2 patches to left in order to prevent that the curve touches the side:

![Linearization Curves]

Smooth curves

This function enables a 16bit interpolation between the dots, which make a gradient much smoother. We recommend to always leave this button on.

Ok / Cancel

If you have checked and corrected all channels for irregular measurement behaviour, hit Ok to save the adjustments or Cancel to discard them.

**Note:** When you re-enter the “Densities...” window, do NOT hit Ok since all the modifications in the "Linearization..." window will be discarded! You can however re-enter the “Densities...” window and hit Ok, if you want to re-set the linearization curves, e.g. when you have done some modifications that you’d like to reset.

Repair curve / Reset ink

It is recommended not to use these buttons. The “Repair curve” button only works in certain specific conditions, but NOT in usual cases as it will destroy the behaviour of the printer’s ink linearization.

Reset all
Mixed ink limit

Print and evaluate the maximum ink quantity using the current densities and linearization curves.

1. Print ink limit chart
   Hit the “Print...” button to print-out the ink limit chart. You can ignore the value that is set in the “Limit” window as it is not used when printing the chart.

2. Enter ink limit
   Enter the value from the printed ink limit chart into the “Limit” field. In digital textile printing, you do not have to steam and wash this print out as it is not color sensitive. However since certain inks might bleed during steaming and washing (e.g. Cyan of Acid inks!) you might be aware to take this in count.

The first bleeding-free patch in the above example is at 250%. You can now put this value into the “Limit” field. Bleeding-free in textile refers to bleeding as ink excess, in other printing environment it might be some different kind of ink excess (non-drying, waves on paper, graininess, mini-vulcanos, etc.)
hueman v2 - Black Generation

After hitting “Next” in the ink cut, linearization and ink limit window you will now get to the part to define the black generation of your printer calibration. This process allows to determine which combination of inks provide the best black as well as to prevent dithering from black ink in light areas if you don’t have a gray ink in combination.

hueman v2 black generation provides 3 methods to generate the black ink:

Default (Black only):
This method is recommended if you have a very good, strong black ink in your printer and if you also have a gray ink (= light black) that prevents dithering from the black ink in light areas. In this case the black generation will be black only.

Black Addition:
This method is recommended if a combination of inks is better than your pure black ink only and if you also have a gray ink (= light black) in the printer to prevent dithering from the black in light areas. Here, the black generation will add the defined values of the additional inks to improve the overall darkness of the result. You can use the “Print...” button to determine whether a combination of colors including black is better than the black ink only.

Gray Component Replacement (GCR):
This method is recommended if a combination of inks is better than your pure black ink and if you don’t have a gray ink (= light black) in your printer. With this method CW7 will replace light areas of black with a combination of CMY inks to visually minimize the dithering from the black ink. Be aware that such a GCR can be critical since the light fastness of C, M and Y inks are not always the same and that after a certain time one of the inks might fade faster than other resulting in a non-neutral behaviour of gray areas (outdoor flag printing!).

Patch file
In order to evaluate whether a combination of inks is better than your pure black ink you can use the “Print...” button to print out a chart for visual analysis. You can select one of the charts in the list. For most printers the BlackAdd_CMYK.psd (or the smaller A4-sheet-fitting BlackAdd_CMYK_A4.psd) will be enough. If you have additional process colors, such as Orange, Blue or Red (not light inks!) you can select the according patch file.

Example: If you have loaded Cyan, Magenta, Yellow, Black, Gray, Orange, Blue, Red in your printer, chose the BlackAdd_CMYK+3.psd (or _small.psd). Since Gray is a light ink, do not count it as a +1 ink.
You can add individual charts to print if you would like to test another set of combinations. Be aware that the chart MUST be in multichannel format so you can arrange the channel order in the “Print...” window. We recommend that you put at least 4 spot channels and name them with Cyan, Magenta, Yellow, Black so that CW7 can auto-assign them to the proper ink channel.

Note that the multichannel file is a special color mode in Photoshop and may not contain CMYK or RGB color channels on top. Save with .psd format.

Print the selected chart for visual analysis. In digital textile printing you should steam and wash the chart since you want to see the final result (as with all charts except with the ink limit charts in most scenarios).

The default charts contain different combinations of black with the other process colors. In the center of each patch you’ll find the 100% black only ink. Around the center is 100% black plus the combination of inks with the values noted aside. If you really find a black that is better outside than inside (better = darker and/or more neutral, etc.) you can use these values to fill them into the “Rich black” fields.

In the example above we can see that the red circled patch shows a better black outside than in the center. We will use K100, C60, M60, Y60 for the “Rich black” fields for either Black Addition or GCR.

Note: Prevent to use extreme combinations, such as K100, C90, M90, Y0 since you might encounter other problems that are not seen with this chart (e.g. light fastness, steaming stability, etc.). We recommend to use a combination containing all values, such as K100, C60, C60, Y30 or K100, C30, M30, Y30, etc for stability purposes.

Of course, only select a “Rich black” if the combination is really better than the black only since you will increase the ink amount leading to higher production costs.

Fill the determined values into these fields. You can only use “Rich black” in combination with Black Addition or Gray Component Replacement method.
The advanced settings of black generation are provided with experienced users only. Usually using the regular black generation window will be sufficient for a high-quality profile. Advanced settings allow to fine-tweak or control certain printing environments but can also lead to wrong results if not used properly. Proceed with care and use the defaults whenever possible.

**Revision**

By default CW7 will automatically select the latest color separation technology in the revision list. The latest revision delivers usually the best result for each specific ink combination. We recommend not to change the revision unless specifically instructed by your distributor or by Inedit.

**Profiling mode**

The default profiling mode for neoStampa is RGB profiling. The profiler included in CW7 (optional license) that creates the ICC profile will only work if RGB is selected. In addition to this, all configuration parameters in the black generation will only be available with RGB profiling mode.

The CMYK profiling can be used if the ICC profile is created with an external profiler that can create ICC CMYK printer profiles. The black generation using CMYK profiling can be defined in the external profiler usually.

**Method**

Refer to the black generation “Method” on the previous page.

**Rich black**

Refer to black generation's “Rich black” on the previous page.

**Balance**

The “Balance” parameter allows to increase or decrease individual inks to balance the black generation combination using Black Addition or GCR. Since the profiling process will correct irregularities in the balance between inks the “Balance” option is not really required and the values should be left at 1.0. In very rare occasions a certain ink may be much stronger (or weaker) in relation to others and can be corrected here. The resulting curve will be displayed in the Black generation preview in the bottom right of this window.
The curve control area allows to specify certain conditions on the curve, such as Black start, Body (light) and Body (dark). The Black start sets the start position of the black ink to the defined value.

The default value for Black start using Black Addition is 33%. It means that the additional colors to achieve a richer black will start to enter after 33% and reach the specified value at 100%. Below 33% only black ink (including gray) will be used.

The default value for Black start using GCR is 10%. This means that below 10% of black generation no black ink will be present but instead replaced with a combination of C,M,Y inks. This is to prevent dithering of the black ink if no gray ink (= light black ink) is present in the ink set.

The Body (light) parameter shapes the curve in the lower area of black generation. The ideal value is experimental but should result in a smooth and regular total curve shape that can be seen in the Black generation preview.

The default value for Body (light) using Black Addition is 83.
The default value for Body (light) using GCR is 33.

The Body (dark) parameter shapes the curve in the upper area of black generation. Also here, the ideal value is experimental and should result in a totally smooth behaviour of the final curve as seen in the Black generation preview.

The default value for Body (dark) using Black Addition is 100.
The default value for Body (dark) using GCR is 66.

neoStampa includes 2 methods for ink limiting:

Smooth:
The default method provides an intelligent ink limiting without clipping behaviour in heavy ink load areas. It optimizes the ink amount in extreme areas to provide smoother behaviour of gradients but sacrifices 2-3% of gamut.

Clip:
The clip method just cuts down exceeding ink to the defined value. Although the gamut might be 2-3% larger in these extreme areas it is possible that gradients in very dark areas are not as smooth as with the above method.

This function improves the gamut behaviour in colorful areas when moving towards saturated, dark colors. Since, especially in digitale textile printing, the regular GCR method doesn’t always directly make a color darker, but turns it duller and sometimes even lighter, an intelligent analysis of color-to-dark is required to improve the combination of colors in the black generation. BlackOptimizer® does this analysis based on whether a color is already dark and therefore uses less GCR to get darker. It is recommended to leave this button always on. If you encounter some dithering from color-to-dark (e.g. if the black ink starts too early) it might help to switch the function off although it might make the printer gamut less linear.

A dot gain can be added to improve overprinting of colors also into dark direction. An insufficient saturation in dark area is sometimes caused by an intermediate ink limit behaviour, which causes a bump between absolute ink limit (2-mix-colors) and the relative ink limit set in the RIP (e.g. 240%). A regular dot gain is usually applied to all colors but from the CIELAB point of view the linearity is not given anymore. The Shadow dot gain parameter adds a dot gain to where it is required only; in already saturated colors to counteract to the bump effect. The default value of 15% is a good balance between improving the bump effect and not laying down too much ink but mainly depends on how heavy the colors have been linearized.

The Early black improves the gradient and linearity from dark-saturated to dark-unsaturated color affecting the black ink directly in normal cases and should be switched on by default. Only switch it off if you experience strong jumps in dark-unsaturated areas from the black ink or a rich black combination.
Printer profiling (requires an optional license)

After the hueman v2 black generation window you will get to the printer profiling when hitting next. This process lets you print a target file, measure the printed patches and generate an ICC RGB printer profile. It is the last step in the calibration process.

Select target file

In order to print a target for your spectrophotometer select in this drop-down bar the appropriate target. For a high-quality profile you should print at least 1500 patches. The names of the spectrophotometers are usually shown in the text: NS7_i1_2250_RGBOptimized.ti2

You should select a target in the upper half of the list (either named with ti2, xml or ref) since it contains both the print chart target and the reference file for measurement.

Print...

After you’ve selected the right target, use the “Print...” button to print out the target file on your media. As with all charts you have to steam and wash it (digital textile printing) or leave it dry for a couple of minutes (paper printing).

Measure...

You are now ready to measure the target. Make sure you select the same target file that you have previously printed and click on the “Measure...” button to open the measurement dialog and to connect with the spectrophotometer. If you need to learn more about the measurement dialog, refer to the “Linearization” chapter in this tutorial. When you finished reading the target, hit Ok to close the measurement dialog and you will see that the “Generate...” button will be selectable.

Load data

If you would like to import a previously stored measurement you can use the “Load data” button to do so. Note that CW7 will check whether the data content corresponds to the correct reference file (e.g. amount of patches, etc.).

Export data

You can also export measured data with this button, e.g. if you’d like to create an ICC profile with an external application such as i1Profiler. CW7 creates CGATS-conform measurement files that are compatible with most ICC profiling software. Select the i1Profiler format if you want to generate the ICC profile with i1Profiler software.
For irregular measurements with structured printing media such as textiles you can specify a certain amount to smooth out error measurements. Obviously, the more you smooth a profile, the less precise the profile will be. It really depends on how regular the measurements have been done. “Few” is basically a good balance between a very little amount of smoothing but maintaining the global precision of an ICC profile. Use “None” if you are sure that your measurements are done regularly (e.g. with paper printing or unstructured media). Only use “Normal” or “High” if the precision of the profile doesn’t count so much and you’d like to achieve smoother gradients in printing.

This button activates the high resolution when creating the profile tables. Internally 45x45x45 interpolations are created based on the measurements. It takes about 3 times longer than without. Deactivating high resolution will create table based on 33x33x33 interpolations.

An ICC printer profile contains 3 tags for rendering intents: colormetric, perceptual and saturation (-> http://en.wikipedia.org/wiki/Color_management#Rendering_intent). The colormetric table that is used for relative and absolute colormetric rendering is always created. The generation of perceptual and saturation tables can be activated with this button. It is recommended to always create all the tables time but it takes about 3-4 times longer for profile generation. If you chose not to create the perceptual and saturation table, these rendering intents in Photoshop will be identical to the (relative) colormetric rendering.

After you’ve measured the target, the “Generate...” button will become available. Select first all the above parameters and then click on this button to generate the ICC RGB printer profile.

A window will pop up to ask how you’d like to name the profile. It is recommended to give the same name to the profile as you give to the complete calibration in order not to get confused. You can also specify where you’d like to save the generated profile to (typically to the Desktop since you can distribute it from there, e.g. to other computers or users or install it to the profile folder of your operation system).

After you have generated the ICC profile it will not be automatically in the profile list. You have to import it using the “+” button next to the list. Click on the button and select the location of the profile (e.g. Desktop). CW7 will then show a list of profiles that have been detected in the specified folder and that are compatible with ICC RGB printer profiles.

Now you can select the profile from the drop-down list.

View the projection of the profile in the gamut viewer. If you make a click into this viewing area another window will pop up showing a color picker with the printable colors. Here you can scroll through the bar to detect error messages or smoothness issues coming from irregular measurements or misreadings.

The last step will be to “Finish...” the calibration by clicking on this button. You will be prompted to give a final name to the calibration which then will automatically become available in neoStampa RIP.

Congratulations!

You have just finished a complete calibration using Calibration Wizard 7 of neoStampa RIP.